

Development of WSPs

-Ensuring Safe Water to People living in
Metropolitan Area of Thailand-



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Office of Assistant Governor (Planning)

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- 1. Introduction***
- 2. WSP Implementation***
- 3. Using WSP in F&D Management Tool***

1. INTRODUCTION



- **State-Owned Enterprise**
- **Responsible Area : 3,195 km²**
- **Serviced Area : 2,402 km² (74%)**
- **Population : 10 million**
- **Connections : 2.3 million**
- **Production Capacity : 5.9 million CMD**
- **Non Revenue Water : 31.7%**

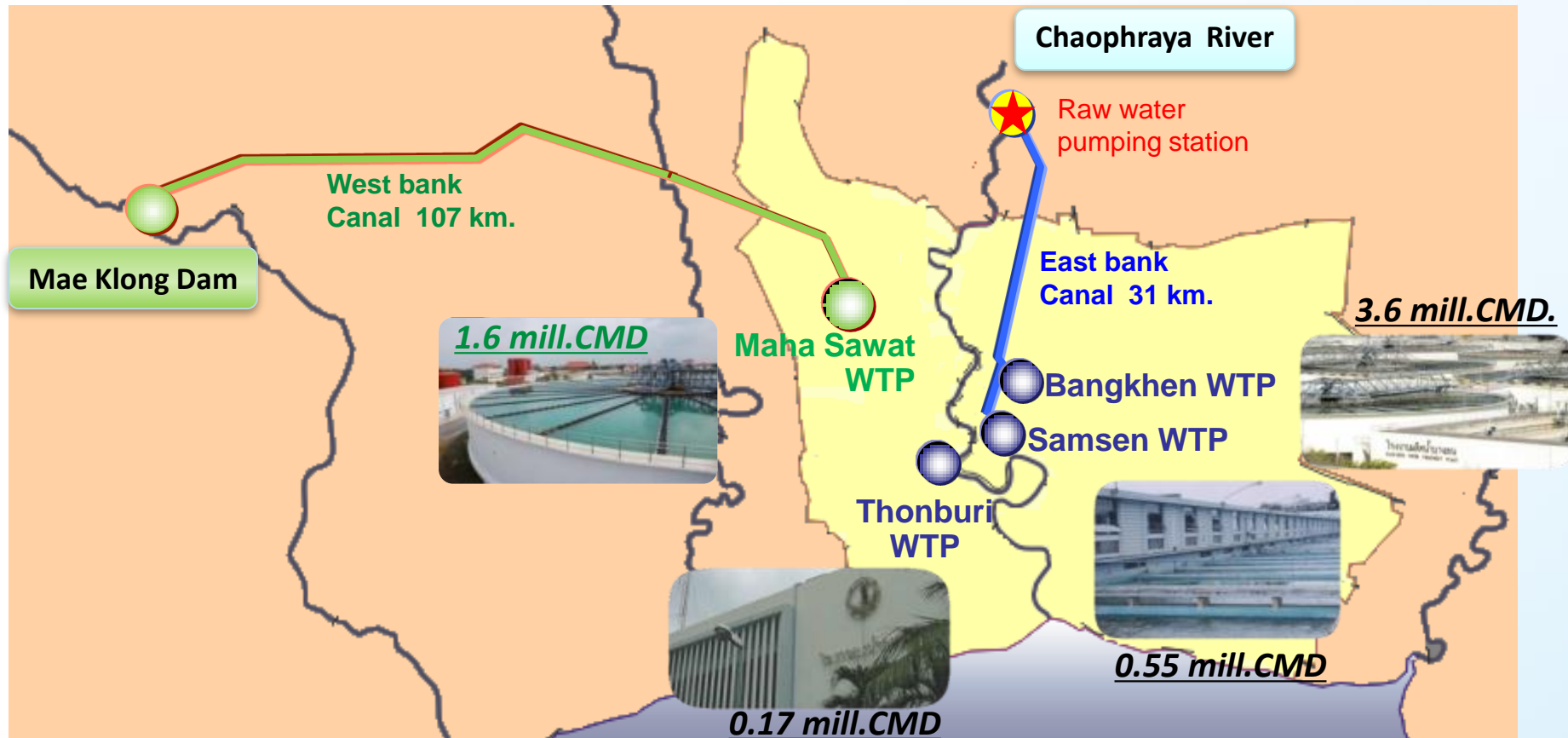
Water Supply System



Raw water



Plant System



2. WSP IMPLEMENTATION

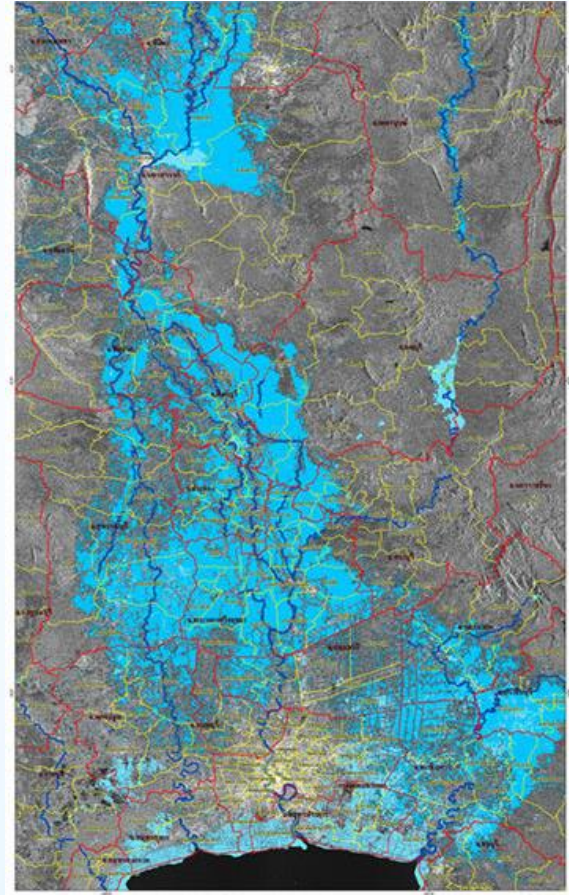
Purposes

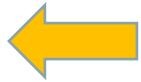
- ✓ To ensure safety and acceptability of water quality
- ✓ To bring back customer's confidence

Drought Crisis From 2013 to 2016



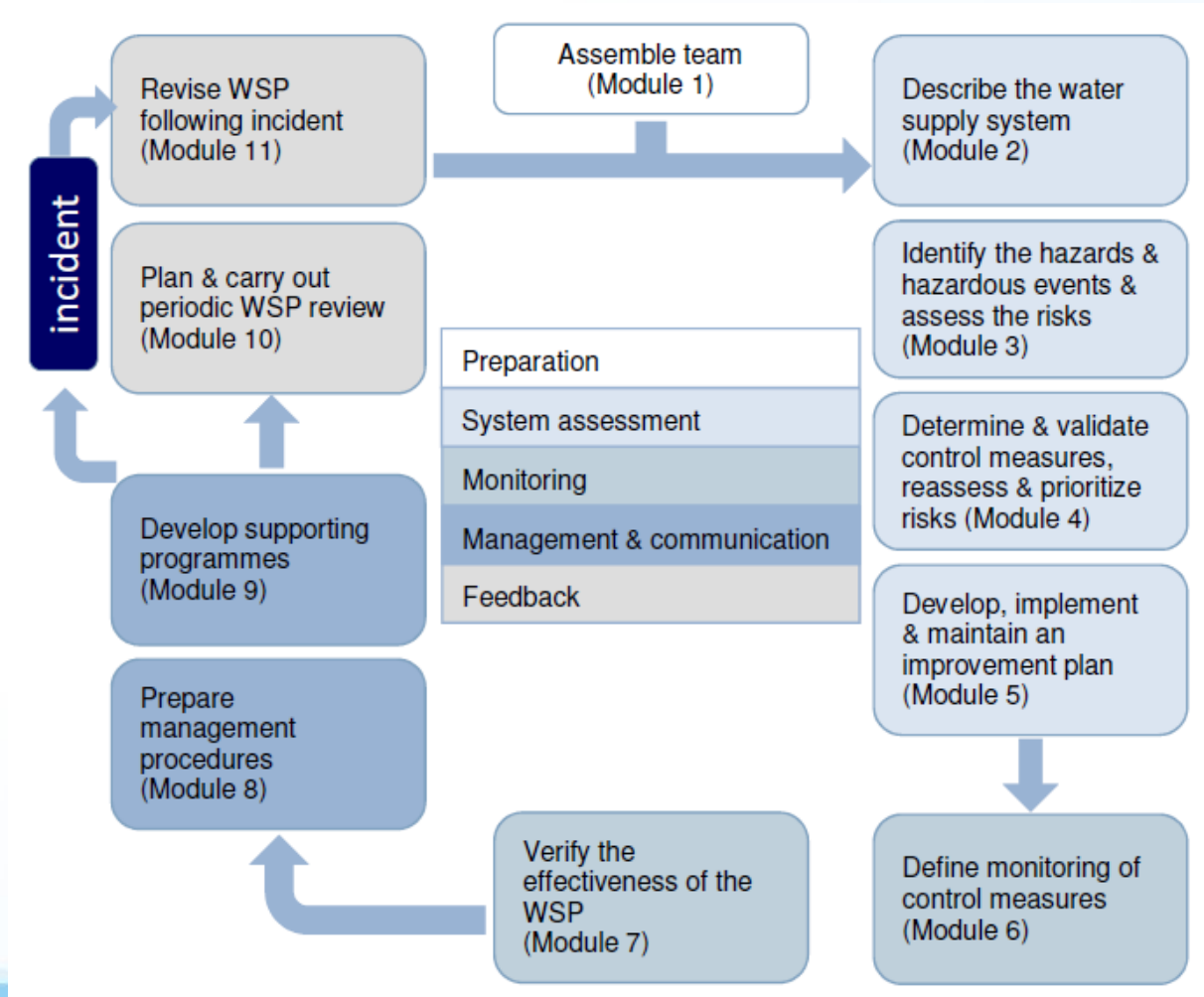
Flood Crisis in 2011



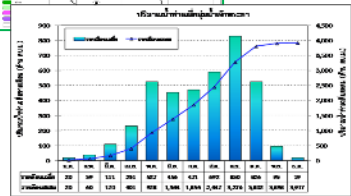


STEPS OF WSP DEVELOPMENT

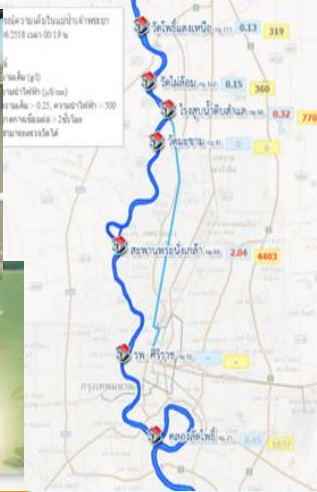
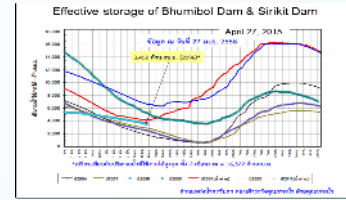
Cr. Water Safety Plans – Training package (WHO/ IWA)



EXAMPLE OF RISK ASSESSMENT OF WATER SOURCES



ประเภทของแหล่งน้ำ	ระดับความเสี่ยง				
	ความเสี่ยงต่ำ	ความเสี่ยงปานกลาง	ความเสี่ยงสูง	ความเสี่ยงสูงมาก	ความเสี่ยงวิกฤต
แหล่งน้ำผิวดิน	5	15	25	35	45
แหล่งน้ำใต้ดิน	4	12	20	30	40
แหล่งน้ำประปา	3	9	15	21	30
แหล่งน้ำดื่ม	2	6	10	14	18
แหล่งน้ำอุปโภค	1	3	5	7	9



Identify monitoring

What /When /Where /
Who/ How /Record



- Aeration
- Powder Activated Carbon
- KMnO₄
- Liquid Oxygen

Activities

✓ New Infrastructure

- Dikes protection
- Fence protection
- Dual power source
- Chlorine booster stations

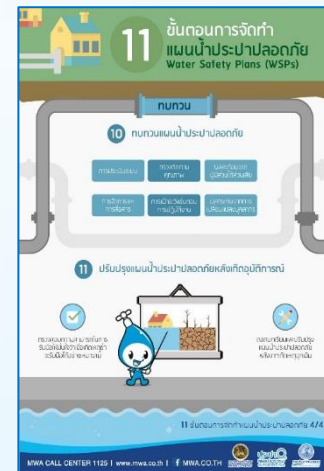
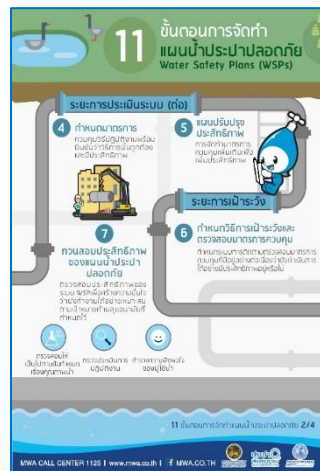
✓ Improve Operation

- Set up new WQ goal for WTP
- Documented SOPs
- HACCP at Thonburi WTP



✓ Communicate WSPs to all staff

- Training
- Workshop
- Lesson learned



✓ WSP Auditing by WHO

- MWA and WHO/SEARO signed MOU on June 10th, 2016
- Informal External Auditing on October 17th – 21st, 2016



How “safe” is MWA’s product?

Regular testing for all parameters

Single test for critical parameters

No tests

Water quality testing



Unsafe drinking-water

Safe drinking-water

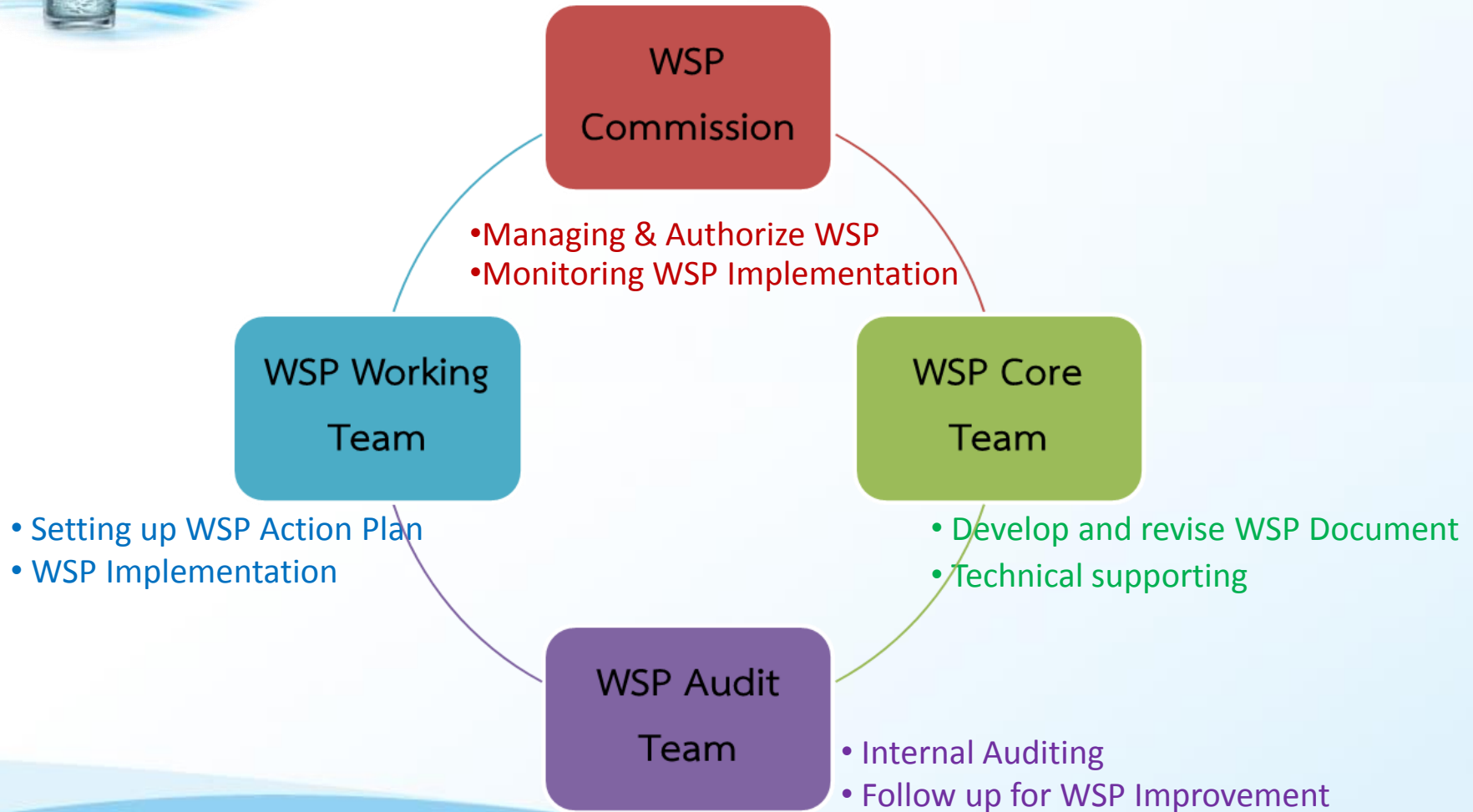
None

Risk management

Fully developed WSPs



Water Safety Plan Teams



3. USING WSP IN F&D MANAGEMENT TOOL

- 2015, MWA provided water quality data.
- 2016-2017, Software was pre-tested by MWA pilot group.
- 2018, WSP core team have learned how to use WSP tool.



3. USING WSP IN F&D MANAGEMENT TOOL

The screenshot shows the 'Flood and Drought Portal' website. The browser address bar shows 'www.floaddroughtmonitor.com/home'. The page header includes logos for 'gef', 'UN environment', 'IWA the international water association', 'DHI', and 'MIKE Powered by DHI'. The user is logged in as 'ParichatP' in the 'mwa_coreteam' workgroup, viewing the 'Chao Phraya' area.

About the DataPortal

The Flood & Drought portal is developed as part of the Flood and Drought Management Tools project. For more information on the project please visit the project home page at: <http://fdmt.iwlearn.org/en>

The Flood & Drought portal provides access to a number of apps supporting decision makers at basin and local level. The aim is to support existing planning processes as TDA/SAP and IWRM at basin scale and Water Safety Planning at local scale through the technical apps. The apps could be used individually or in connection.

Please visit the [user guide](#) for more indepth information on the use of the apps and their intended support for the different stages within basin and local level planning.

Knowledge portal with discussion forum and upcoming online courses: Select the "Knowledge portal" in the ? menu or use the link - [KnowledgePortal](#)

For video tutorials and overview: [YouTube](#)

For technical exercises (pdf files) : [Dropbox](#)

For technical questions please contact:

[Oluf Jessen \(Project manager\)](#) or [Bertrand Richaud \(Water resources expert\)](#)

Tools Available:

- DATA AND INFORMATION**: Access to near real-time data. Flood and drought indices. Climate forecast and climate change data.
- DROUGHT ASSESSMENT**: Locate and identify hazards, estimate impacts and provide risk assessment.
- FLOOD ASSESSMENT**: (Under development). Locate and identify hazards, estimate impacts and provide risk assessment.
- ISSUE ANALYSIS**: Causal Chain analysis and WRIAM. Understand and prioritise the causes behind issues.
- WATER INDICATOR**: Identify water related indicators to support management and decision-making.
- BASIN PLANNING**: Create and evaluate basin plans. Linkage to water resource model.
- WATER SAFETY PLANNING**: Support water safety planning.
- REPORTING**: User configured templates providing linkage to overview reports or bulletins. Specific templates for TDA/SAP, IWRM and WSP.

Activate Windows
Go to PC settings to activate Windows.

Windows Taskbar: 9:36, 4/6/2561



Flood and Drought Portal

User: ParichatP

WATER SAFETY PLANNING

- Open
- New
- Clone
- Edit
- Delete

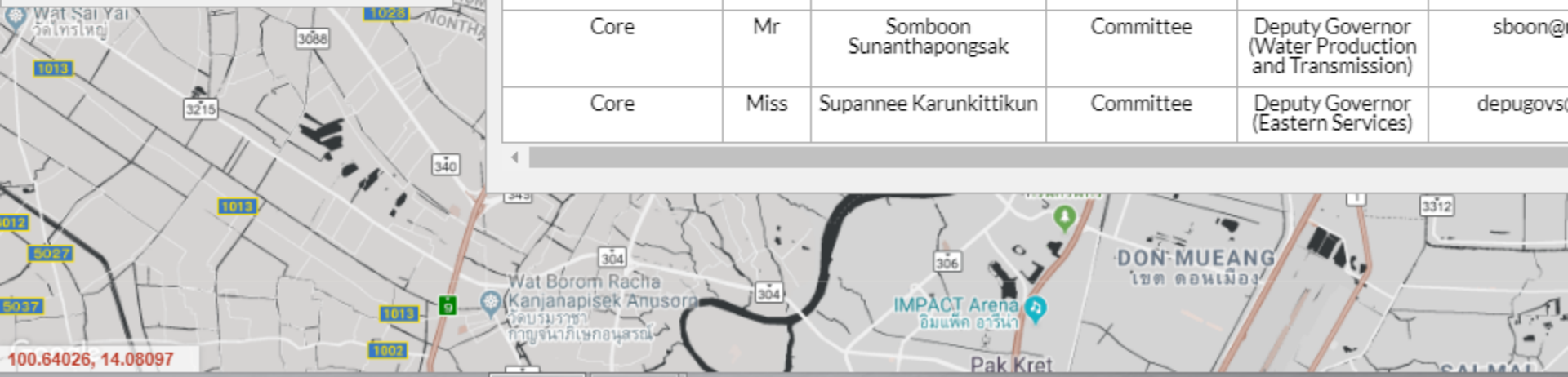
Plan: CoreTeam Training9-10 User: ParichatP Last change: 2018-05-09 09:28:06 Description: 2018

- Module 1: The WSP team
- Module 2: Water supply system
- Module 3: Hazards and risks
- Module 4: Control measures
- Module 5: Improvement plan
- Module 6: Monitoring control measures
- Module 7: Verification of WSP
- Module 8: Management procedures
- Module 9: Supporting programmes
- Module 10: Periodic review of the WSP
- Module 11: Revision after an incident

The WSP Team

Team members

Extended/Core Team	Title	Name	Role	Affiliation	E-
Core	Mr	Chaiwat Vorapeboonpong	Committee	MWA Expert Level 10	psithai@
Core	Mr	Jumroen Tantiwongwat	Committee	Deputy Governor (Western Services)	jumroen.t
Core	Mrs	Lawan Chatrungchewan	Committee	Deputy Governor (Planning and Development)	nlawan@
Core	Mr	Prinya Yamasamit	Leader	Governor	mwagov@
Core	Mrs	Siwilai Kitpitak	Secretary	MWA Expert Level 8	siwilai.k@
Core	Mr	Somboon Sunanthapongsak	Committee	Deputy Governor (Water Production and Transmission)	sboon@
Core	Miss	Supanee Karunkittikun	Committee	Deputy Governor (Eastern Services)	depugovs



100.64026, 14.08097



Flood and Drought Portal

WATER SAFETY PLANNING

User: ParichatP

Workgroup: WS

- Open
- New
- Clone
- Edit
- Delete

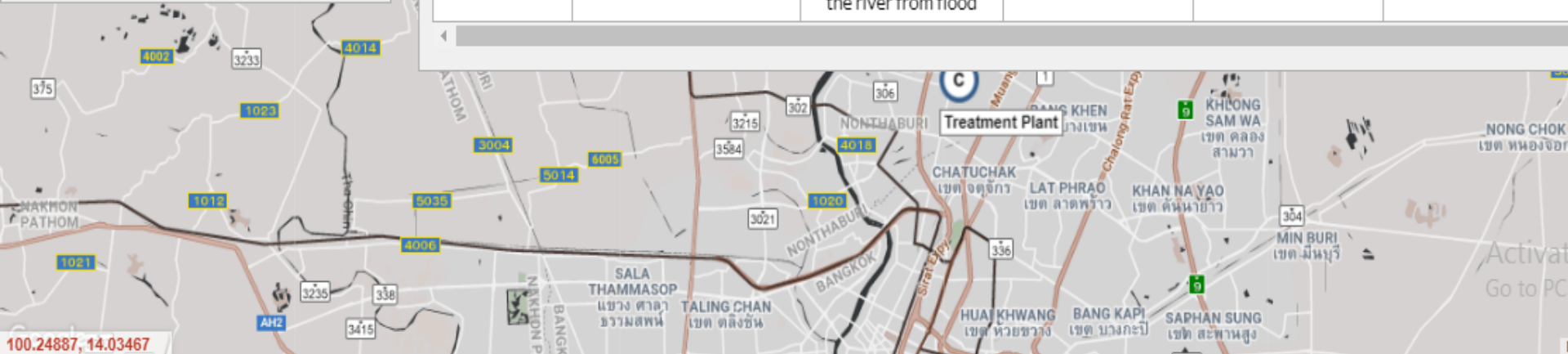
Plan: WSP MWA User: ParichatP Last change: 2017-11-28 08:34:30 Description:

- Module 1: The WSP team
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Hazards and Risks Overview

[View Risks](#) [Add new Hazard](#)

Area	Process step	Hazardous Event	Risk Rating (before controls)	Risk Rating (after controls)	Risk Rating (climate change)
Catchment	Catchment	Chemical contamination due to water overflow from excess use of pesticide in paddle field	Very high risk	Very high risk	Very high risk
Catchment	Catchment	High turbidity due to soil dissolve from heavy rain	Very high risk	Medium risk	High risk
Catchment	Catchment	Microbial contamination due to wastewater from sewage system leaks to the river from flood	Very high risk	High risk	Very high risk





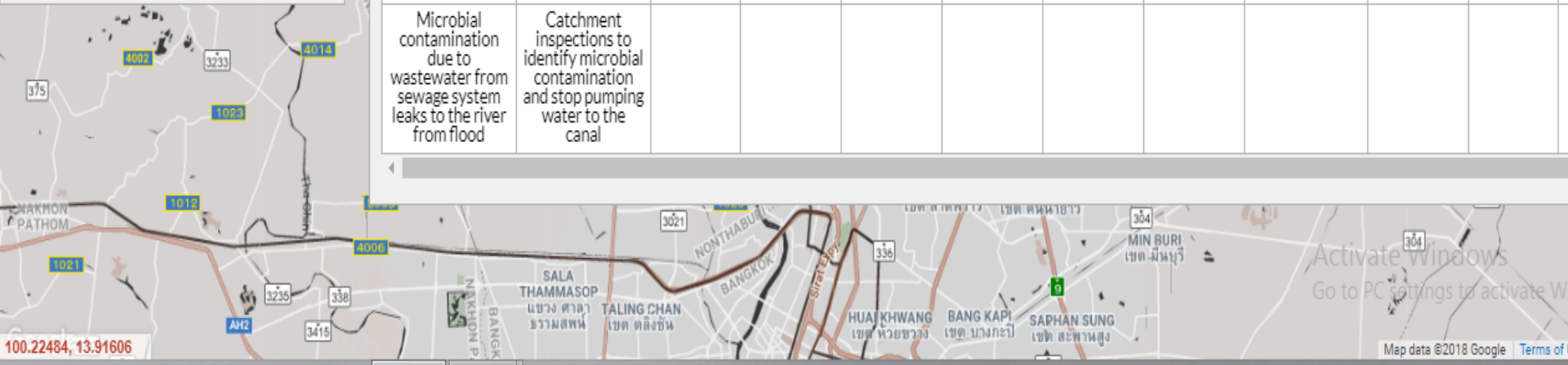
Flood and Drought Portal

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Monitoring of control measures

Hazardous Event	Control Measure	Critical limit	What	Where	When	How	Who	Corrective action	Data provider	Data type
Chemical contamination due to water overflow from excess use of pesticide in paddle field	Catchment inspections to identify chemical contamination and stop pumping water to the canal	No pesticide found in raw water			Always					
High turbidity due to soil dissolve from heavy rain	Alum dosing for pretreatment to reduce water turbidity	Turbidity of raw water entering plant <	Turbidity of raw water entering plant	Sampling point before water entering the plant	Always	Online Monitoring	Lab Staff	Notify plant to handle high turbidity water	Turbidity test result from online equipment	Trend of the turbidity that tend to be increased
Microbial contamination due to wastewater from sewage system leaks to the river from flood	Catchment inspections to identify microbial contamination and stop pumping water to the canal									



Activate Windows
Go to PC settings to activate Windows



Flood and Drought Portal

WATER SAFETY PLANNING

Open New Clone Edit Delete

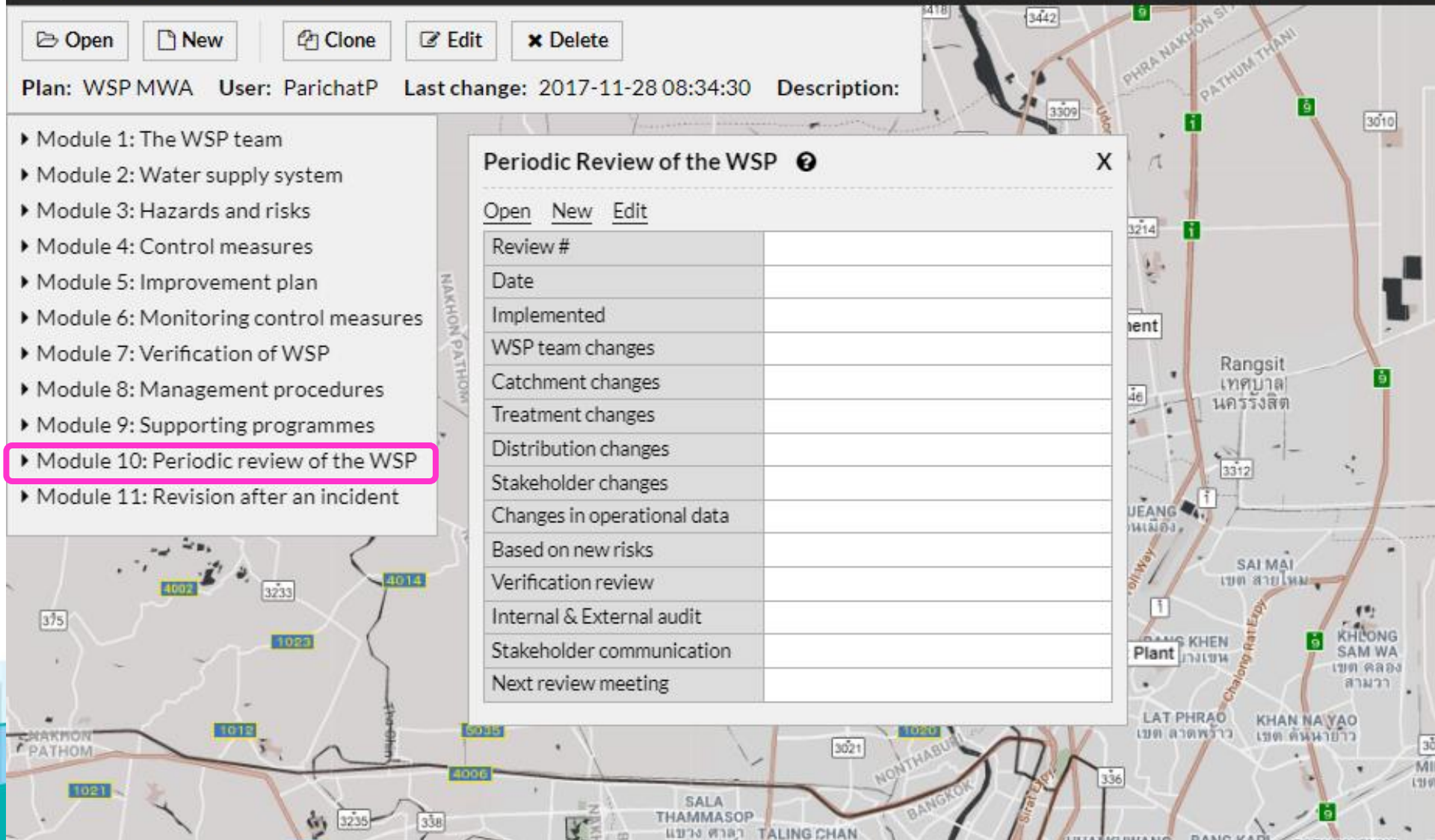
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- ▶ Module 9: Supporting programmes
- ▶ **Module 10: Periodic review of the WSP**
- ▶ Module 11: Revision after an incident

Periodic Review of the WSP

Open New Edit

Review #	
Date	
Implemented	
WSP team changes	
Catchment changes	
Treatment changes	
Distribution changes	
Stakeholder changes	
Changes in operational data	
Based on new risks	
Verification review	
Internal & External audit	
Stakeholder communication	
Next review meeting	





Flood and Drought Portal

MI
Powered b

- Open
- New
- Clone
- Copy
- Edit
- Delete

Issue: Drought
 User: ParichatP
 Last change: 2018-06-04 04:53:51
 Description: Drought occurrence in Chao Phraya

Issue analysis

No importance
 Slight negative impact
 Moderate negative impact
 Negative impact
 Significant negative impact
 Major negative impact

Immediate impact	Immediate cause	Underlying cause	Root cause	Extent	Seriousness	Permanence	Irreversibility	Cumulative character	Level of documentation	Score	Assessment
Drought Occurrence	Reduce water levels in the dam	Over abstraction, Lack of rain	climate change	National (3)	Significant change (2)	Temporary (2)	Reversible (2)	Moderate (2)	Some (2)	36	Significant negative impact

Activate Windows
 Go to PC settings to activate Windows.



Flood and Drought Portal

User: Pa

DATA AND INFORMATION

Data x Document

Select Status GIS layers

Rainfall (TRMM)

- Rainfall (TRMM)
- Effective drought Index (EDI)

Rainfall forecast

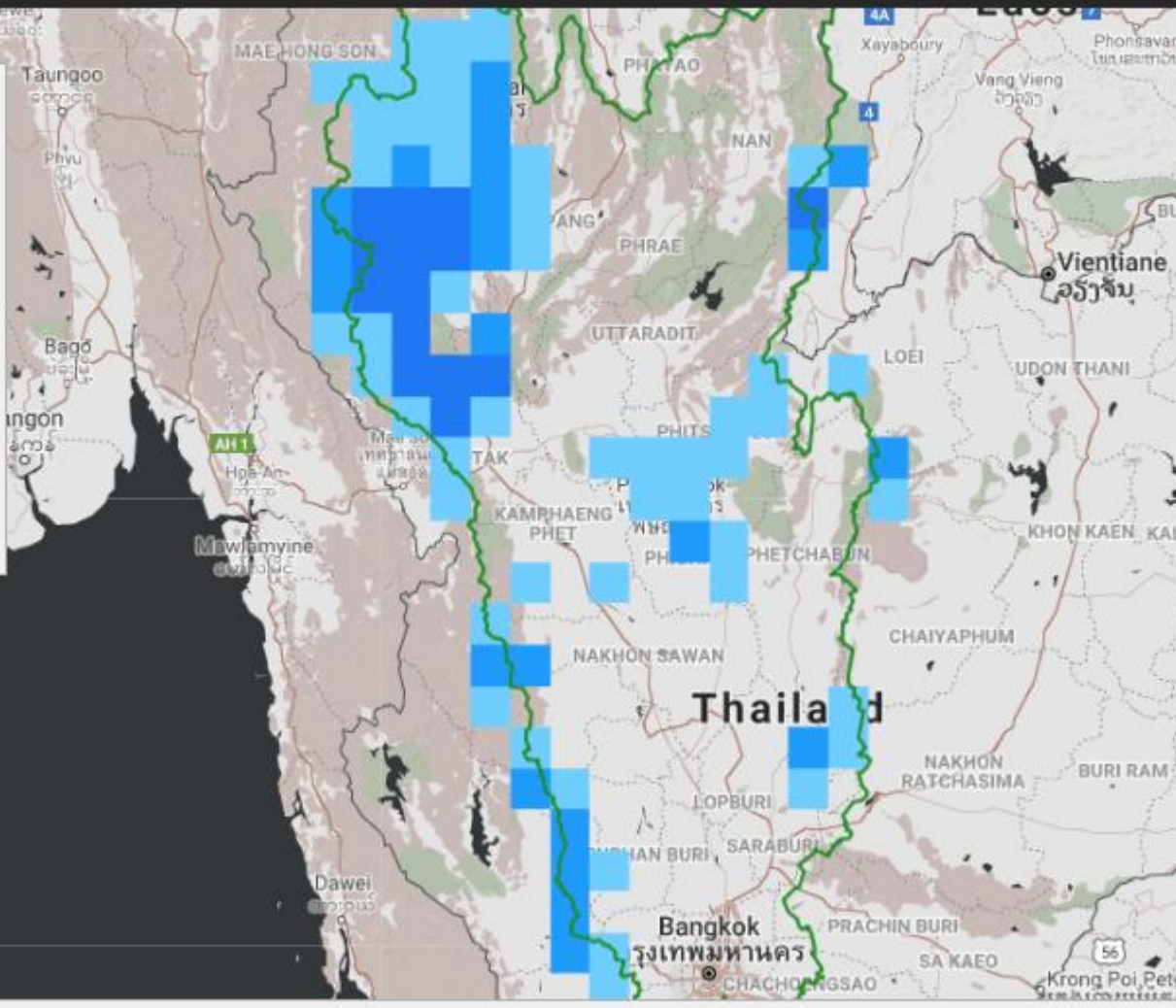
- Seasonal forecast

Temperature

- Temperature
- Temperature deviation

Tool

- Time series
- Raster file





***Thank you
for your attention***